

Math 1A Sections 308-309  
Worksheet 11: November 30, 2009

**Warm-up Questions - Work by yourself or with a neighbor**

1. Find the derivative of the function

$$y = \int_{\cos x}^{x^2} t^2 \ln(t) dt.$$

2. Evaluate the integral

$$\int_1^{64} \frac{1 + x^{1/3}}{\sqrt{x}} dx.$$

**Group Problems (*u*-substitution)**

1. Find antiderivatives for the following functions.

- $f(x) = x \cos(x^2)$
- $f(x) = (x^{1/3} + 2)/(x^{2/3})$
- $f(x) = x\sqrt{5x+1}$ .
- $f(x) = \frac{(\ln(x))^2}{x}$ ,
- $f(x) = \frac{1+\cos^2(\theta)}{\cos^2(\theta)}$ .

2. Evaluate the following integral (hint: Draw a graph and think about area)

$$\int_0^3 (1 + \sqrt{9 - x^2}) dx.$$

3. Find the derivative of the function

$$G(x) = \int_{\sqrt{x}}^{x^3} \sqrt{t} \sin(t) dt.$$

4. Prove that  $1/e \leq \int_0^1 e^{-x^2} dx \leq 1$ .